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Invention Specifications for the Inventor's Certificate

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Device for Insertion of a Prosthesis into a Blood Vessel

The invention pertains to vascular surgery. To ensure remote insertion the device contains a flexible tubular guide made of two parts 1 and 2 separable along the diameter and equipped with flanges 3 and 4 facing each other, a pusher 5, a blind coupling 6. The prosthesis is designed in the form of a porous cylindrical frame 7 and a fastening element 8 connected to it. The prosthesis and pusher 5 are placed in part 2 of the tubular guide. An elastic rod 9 with a wire coil 10 is placed in this part between fastening element 8 and pusher 5. The other part of the tubular guide 1 has the possibility of free displacement along a cnductor, equipped with a soft tip, and along an elastic tube positioned on it also with the capability of movement, the outside diameter of which is less than the inside diameter of the guide. Four figures.

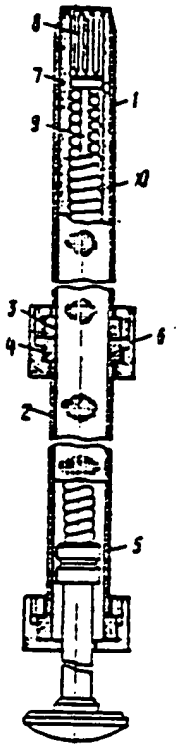

Figure 1.

Specification

The invention pertains to vascular surgery, namely, to devices for insertion of self-fastening prostheses into a blood vessel.

The objective of the invention is to ensure remote insertion.

Figure 1 schematically depicts the device in longitudinal profile; Figure 2 shows part of the flexible tubular guide with conductor; Figure 3 shows part of the flexible tubular guide with pusher and the elastic rod with prosthesis; Figure 4 shows the self-fastening vascular prosthesis.

The device contains a flexible tubular guide made from two parts **1** and **2** separable along the diameter and equipped with flanges **3** and **4** facing each other, a pusher **5** for movement of the prosthesis, a blind coupling **6** that connects the separable parts of the guide.

The prosthesis is designed in the form of a porous cylindrical frame **7** and a fastening element **8** connected to it. The latter is designed in the form of a flat spring with a zig-zag shape, bent into a ring. The prosthesis and pusher **5** are placed in part 2 of the tubular guide. An elastic rod **9** with a wire coil **10** wound onto it is placed in this part of the guide between the fastening element **8** and pusher **5**. The other part of the tubular guide **1** has the capability of free movement along the thin conductor **11** equipped with a soft tip **12** and along an elastic tube **13** positioned on it also with the capability of relative displacement, the outside diameter of which is slightly less than the inside diameter of the guide.

The operating principle of the device during insertion of a self-fastening prosthesis into the abdominal aorta or iliac artery through the femoral artery is as follows. Before use of the device the separable parts of the flexible tubular guide are detached from each other. The frame **7** of the prosthesis is fitted onto the elastic rod **9** to its end stop with fastening element **8**. By compressing the fastening element in the radial direction to the minimal possible cross section less than the inside diameter of the guide, the prosthesis is inserted with the elastic rod into part **2** of the guide and then pusher **5** is inserted.

In a patient with an established diagnosis (for example, constriction of the iliac artery) the femoral artery is isolated, tourniquetted and a longitudinal arteriotomy and dilation of the iliac artery are carried out. Conductor **11** is introduced above the location of the proposed insertion of the prosthesis in the aorta.

During introduction and movement of the conductor within the vessel it comes in contact with the walls of the vessel by means of soft tip **12** and bends in accordance with the natural curvature of the vessel. Elastic tube **13** is also moved along the conductor above the location of insertion of the prosthesis in the vessel. Thereupon part **1** of the guide is fitted onto the overhanging part of the conductor and the elastic tube fitted onto it emerging above the wound and it is moved along the elastic tube in the vessel. During movement of this part of the guide in the vessel the latter moves according to a trajectory determined by the conductor and elastic tube, which prevents vascular trauma.

After insertion of part **1** of the guide into the required segment of the vessel it is held in this position behind the overhanging section emerging above the wound and conductor **11** and elastic tube **13** are withdrawn from its cavity. Part **2** of the guide with the prosthesis is then connected by coupling **6** to this part of the guide and the flexible tubular guide becomes a single line. Displacement of the prosthesis from part **2** into part **1** of the guide is carried out by means of pusher **5**.

The presence of an elastic rod **9** between the pusher and fastening element **8** prevents deformation of the vessel during movement of the prosthesis in part **1** of the guide owing to repetition of the vessel's curvature by the elastic rod.

Fastening the pusher **5** in a fixed position, the flexible tubular guide is gradually withdrawn.

During emergence of the prosthesis from part **1** of the guide into the segment of the vessel being provided with a prosthesis spontaneous expansion of the prosthesis occurs under the influence of the elastic forces of the fastening element **8**. Frame **7** comes into tight contact with the walls of the vessel here.

After movement of the prosthesis in the vessel, holding pusher **5** in this position, the guide is withdrawn as a whole from the vessel and then the elastic rod and pusher. The lower end of the prosthesis is sewn to the artery below the location of the arteriotomy.

This design of the device permits remote insertion of a self-fastening prosthesis into vessels via an arteriotomy of the femoral artery, for example, into the thoracic or abdominal aorta, into iliac arteries without making access to them.

Claim

Device for insertion of a prosthesis into a blood vessel, containing a flexible tubular guide and pusher of the prosthesis, characterized by the fact that, in order to ensure remote insertion, it is equipped with a guide conductor and elastic rod for movement in the vascular prosthesis and the guide is made from two parts separable along the diameter, one of the parts having the capability of free movement along the conductor, while the pusher and elastic rod with prosthesis are positioned in its other part.

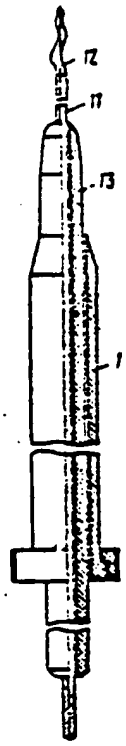

Figure 2.

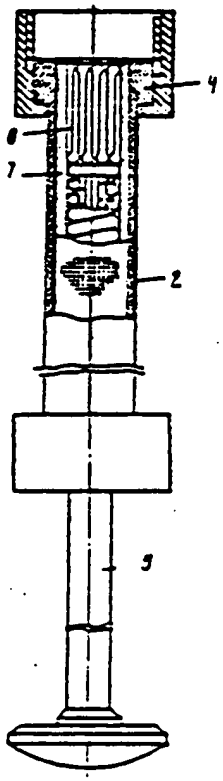

Figure 3.

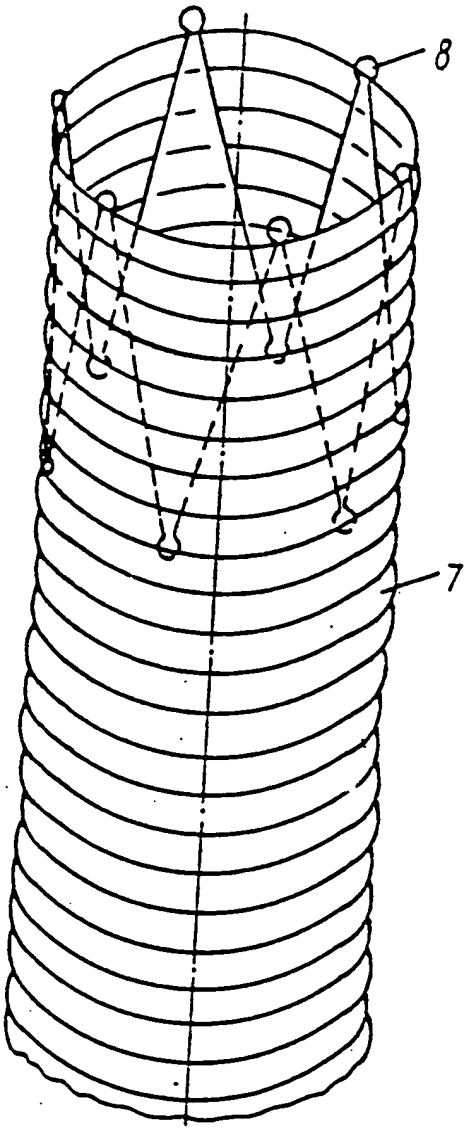

Figure 4.